







# Minnesota Pollution Control Agency

Celebrating our 25th anniversary and the 20th anniversary of the Clean Water Act

RECEIVED  
WMD RCRA  
RECORD CENTER

MAR 4 - 1993

*Compliance*

*DIANE'S*

February 16, 1993

RECEIVED

FEB 22 1993

OFFICE OF RCRA  
Waste Management Division  
U.S. EPA, REGION V

Mr. Kevin M. Pierard  
Chief of MN/OH Enforcement Section  
United States Environmental Protection Agency  
Region V  
77 West Jackson Boulevard  
Chicago, Illinois 60604-3590

Re: U.S. EPA Review of the Paramax Corp. Corrective Action Agreement

Dear Mr. Pierard:

The United States Environmental Protection Agency (U.S. EPA) recently reviewed a draft Corrective Action Agreement for Paramax Corporation in Eagan, Minnesota, and in your letter of December, 1992, you commented on both on that Agreement and more generally upon the provisions of the form of Corrective Action Agreement used by the Minnesota Pollution Control Agency (MPCA). In your letter (copy enclosed) you made a number of suggestions regarding changes to the Agreement. This letter is to advise you of the status of your recommendations.

1. The background section of the generic form of the MPCA Agreement has been revised, so that future Agreements will include a description of how the contaminants dealt with in the Agreement could adversely affect human health and the environment.
2. A provision has been added to the Agreement to the effect that if, during investigation of suspected contamination at a site, or during the course of the Agreement, additional contamination is discovered, the party conducting the on-site remediation will be required to investigate and remediate the release, as directed by the MPCA.
3. While the current form of Agreement does not have a force majeure clause captioned as such, it does provide, in a paragraph in the General Conditions section of the Agreement captioned Extension of Time, that the MPCA may grant extensions of time schedules on those occasions when the other party to the Agreement demonstrates good cause for granting the extensions. While the MPCA clause is not as detailed as the clause in the EPA Agreement, we believe it is adequate and less likely to be confusing to the other party.

4. The section of the MPCA Agreement captioned Project Leaders has been deleted.

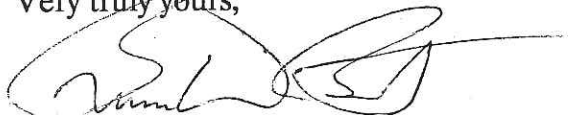
5. The section captioned Covenant Not To Sue will remain in the Agreement, inasmuch as it only provides that so long as the other party complies with all of the terms of the Agreement, the MPCA will not sue him or it for the violations dealt with in, and presumably remedied pursuant to, the Agreement. We do not believe that this compromises the MPCA's ability to implement its program and enforce applicable environmental laws fully. The provision is carefully limited in its terms, and it not only seems fair to the other party, but may be essential consideration for the other party to enter into the Agreement.

6. Similarly, the MPCA has made a decision not to revise the Disputes Resolution section of the Agreement in an attempt to preclude judicial review of decisions made by the Commissioner of the MPCA or the MPCA Board as a part of the dispute resolution process. Such a revision seems heavy-handed and possibly unfair, and of questionable enforceability.

7. Finally, we believe the Corrective Action Agreement as written, with its Exhibit A regarding a site work plan, contains a broad generic work plan that is adequate for most purposes, even when it has been revised to make it more site specific. If, however, you have more specific concerns about the work plan, we would be pleased to hear from you.

I hope this letter has addressed all of your concerns, but if you wish to discuss anything further, please feel free to call me at (612) 297-8380.

Very truly yours,



Bruce W. Brott  
Permit and Review Unit





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590

RECEIVED  
WMD RECORD CENTER

SEP 21 1994

JAN 10 1994

REPLY TO THE ATTENTION OF:  
HRE-8J

Mr. Bruce Brott  
Minnesota Pollution Control Agency  
Hazardous Waste Division  
520 Lafayette Road  
St. Paul, Minnesota 55155-4194

RE: Paramax Systems Corporation,  
Unisys Park Facility,  
Corrective Action Agreement;  
MND000823914

Dear Mr. Brott;

The U.S. EPA has reviewed your request for termination of the Corrective Action Agreement at the above-referenced facility. Based on the information provided, the U.S. EPA agrees with your determination that a Corrective Measures Study does not need to be performed at this facility at this time. U.S. EPA agrees that termination of the Corrective Action Agreement is warranted. If you should have any questions concerning this letter, please contact Sally Averill at (312) 886-4439.

Sincerely yours,

Kevin M. Pierard, Chief  
MN/OH Technical Enforcement Section





**Minnesota Pollution Control Agency**

520 Lafayette Road North  
St. Paul, Minnesota 55155-4194



HRBW-85

Mr. Charles Slaustas 5HS  
U.S. EPA Region V  
230 South Dearborn Street  
Chicago, Illinois 60604



RECEIVED

JUN 1 1992

STATE OF MINNESOTA

OFFICE OF RCRA  
Waste Management Division  
MINNESOTA POLLUTION CONTROL AGENCY  
U.S. EPA, REGION 5

In the Matter of:  
PARAMAX SYSTEMS CORPORATION  
3333 Pilot Knob Road  
Eagan, Minnesota

HAZARDOUS WASTE DIVISION  
CORRECTIVE ACTION AGREEMENT

## I. RECITALS

A. Parties. The parties to this Corrective Action Agreement (Agreement) are the Minnesota Pollution Control Agency (MPCA) and Paramax Systems Corporation (A Unisys Company) (Company).

B. MPCA Authority. The MPCA is the agency of the State of Minnesota with the duty to administer and enforce the laws and rules relating to the prevention, control, or abatement of water, air, noise, and land pollution and to the generation, collection, transportation, storage, disposal, and other management of hazardous waste in the state. This Agreement is entered into pursuant to the authority vested in the MPCA by Minn. Stat. chs. 115 and 166 (1988).

C. Rules. The MPCA, after legal notice and hearing thereon, has adopted and has filed in the Office of the Secretary of State, rules regulating hazardous waste activities that have the force and effect of law and general application throughout the State of Minnesota, which rules are set forth in Minn. Rules ch. 7045, et seq.

D. Definitions. Unless otherwise explicitly stated, the definitions in Minn. Stat. chs. 115 and 116 (1988) and in Minn. Rules pt. 7045.0020 shall control the meaning of the terms in this Agreement. All references to this Agreement shall be deemed, unless clearly inappropriate, to include all exhibits hereto.

E. Statement of Facts. For the purpose of this Agreement, the following constitutes a summary of the background upon which this Agreement is based.

## II. BACKGROUND

The Company located at 3333 Pilot Knob Road in Eagan, Minnesota, occupies a site consisting of approximately 236 acres. On April 8, 1992, the Company, which manufactures components for computer systems, changed its status as a permitted hazardous waste storage facility to that of a large quantity hazardous waste generator. Hazardous wastes are generated in the production of semiconductors and from multiple process laboratories used for research and development.

Attached as Exhibit B is the October 26, 1990, Resource Conservation and Recovery Act (RCRA) Facility Assessment (RFA) prepared by MPCA staff. A number of Solid Waste Management Units (SWMUs) were identified in the RFA, but only the underlying soils beneath the presently nonoperational subgrade wet chemical process room SWMU was determined to need further investigation for the following reasons:

1. When the wet chemical process room was operating, corrosive rinse waters containing lead, chromium, tin, and copper were generated during plating operations on a routine basis. These rinse wastes drained through a grated floor to the containment system consisting of a sloped coated concrete floor and a centralized collection sump.

2. In January of 1989, the Company informed MPCA staff that the concrete floor and sump were replaced in January 1985, due to a loss of structural integrity caused by the corrosive rinse wastes. A new brick flooring system was installed along with a vinyl ester resin fabric reinforced lined sump (hereafter, sump).

3. On September 14, 1990, during the RFA preliminary assessment, the Company reconfirmed that chromic sulfuric etchant of unknown volume was released to the soils from the wet chemical process room sump at some time prior to 1985. The certification stated the release was caused from the loss of structural integrity. There was no indication of the duration of the release.

4. EP Toxic Analysis (leaching procedure) of concrete floor debris from sump reconstruction indicated chromium levels at 30 parts per million (ppm) which exceeded the Maximum Concentration Level of 5 ppm in Minn. Rules pt. 7045.0131, subp. 8. Hence the concrete debris was determined to be characteristically hazardous for chromium and disposed of as such.

5. Although analysis of the concrete floor debris was conducted, the Company did not analyze the underlying soils beneath the corroded sump prior to installing the new containment system.

6. A ground water investigation initiated by the Company in September 1988. Chromium contamination was consistently being detected in the ground water. To formally define the extent of contamination, potential sources, potential receptors, and ground water flow direction, on August 30, 1990, MPCA staff requested that the Company perform a RCRA Facility Investigation (RFI).

7. The RFI work plan was approved on July 26, 1991, which incorporated two (2) additional wells to the existing monitoring network for a total of ten (10) ground water monitoring wells at the site. The RFI only focused on ground water contamination.

8. On April 2, 1992, the Company submitted a RFI progress report documenting ground water monitoring results for the last four (4) quarters. The progress report identified ground water contamination in which chromium levels in two (2) monitoring wells have exceeded the current Maximum Contaminant Level (MCL) and the Minnesota Department of Health's Recommended Allowable Limit (RAL) ground water standard for two (2) quarters of sampling during this period. A final quarter of data will be submitted when available in the form of a final RFI report.



9. WITHOUT A COMPLETE INVESTIGATION, THE MAGNITUDE OF THE RELEASE FROM THE SUMP REMAINS UNDEFINED AS WELL AS THE NEED FOR REMEDIATION TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT. IT IS THEREFORE THE INTENT OF THIS AGREEMENT TO PROMOTE INVESTIGATION OF SOILS UNDERLYING THE SUMP IN A TIMELY MANNER AND INITIATE APPROPRIATE CORRECTIVE ACTION IF WARRANTED.

### III. AGREEMENT

NOW, THEREFORE, the MPCA and the Company hereby agree and stipulate as follows:

#### A. Purpose

The purpose of this Agreement is to establish an enforceable compliance schedule pursuant to which the Company shall undertake the activities described in this Agreement in order to achieve and maintain compliance with Minnesota statutes and rules.

#### B. Company Requirements

1. Corrective Action Requirements. Appended to and made an integral and enforceable part of this Agreement is Exhibit A which describes the investigation of releases from the wet chemical process room SWMU, the evaluation of corrective measures, and the implementation of selected corrective measures. The Company agrees to complete the requirements of Exhibit A in accordance with the time schedules set forth in Exhibit A. The MPCA and the Company recognize that the results of any investigation may indicate the need for corrective measures at the Site. If such measures are determined by MPCA staff to be necessary under the circumstances, the Company agrees to undertake these measures as described in the Corrective Measures Study (CMS) outlined in Exhibit A. In the event of disagreements between the MPCA staff and the Company as to whether these measures are appropriate [needed and reasonable], Part III.C.4 of this Agreement (relating to Resolution of Disputes) shall apply.

2. Recovery of Future Expenses. The Company agrees to reimburse the Environmental Response, Compensation, and Compliance Fund for all costs incurred by MPCA staff in connection with matters related to implementation of this Agreement after the effective date hereof. WITHIN THIRTY (30) CALENDAR DAYS after the end of each calendar year, MPCA staff shall submit to the Company a statement of expenses incurred by the MPCA during the previous calendar year. WITHIN SIXTY (60) CALENDAR DAYS following the receipt of the statement, the Company shall pay the required sum into the Environmental Response, Compensation and Compliance Fund.

#### 3. Stipulated Civil Penalties for Violation of this Agreement

(a) Failure To Make Timely Submittals. If the Company fails to make any submittal required in this Agreement, the Company shall pay into the Environmental Response, Compensation and Compliance Fund of the Treasury of the State of Minnesota the sum of One Thousand Dollars (\$1,000) for each submittal not received by MPCA staff, for each day or portion thereof that such submittal is not received. The Company shall not be liable for payment under this paragraph with respect to a submittal if it has submitted to

MPCA staff a timely request for an extension of time for such submission and such extension has been granted.

(b) Failure to Complete Requirements in a Timely Manner. If the Company fails to complete any requirement of this Agreement other than a requirement to make submittals, the Company shall pay into the Environmental Response, Compensation and Compliance Fund of the Treasury of the State of Minnesota the sum of Two Thousand Five Hundred Dollars (\$2,500) for each such requirement for each day or portion thereof that such requirement is not completed. The Company shall not be liable for payment under this paragraph if it had submitted to MPCA staff a timely request for an extension of time for completion of such requirement and such extension has been granted.

(c) Procedures. If MPCA staff determine that the Company has failed to complete any requirement of this Agreement, MPCA staff shall give written notice to the Company of such failure, specifying the provisions(s) of this Agreement which the Company has not completed. Payments required by paragraphs 3(a) or 3(b) shall accrue from the date on which the delinquent submittal was to have been made or the work was to have been completed and shall cease to accrue upon receipt of the required submittal by MPCA staff or upon completion of the required work. The Company shall pay any required sum WITHIN THIRTY (30) CALENDAR DAYS after receipt of notification from MPCA staff that such payment is due. The Company retains the right to dispute the factual basis for the MPCA staff's determination that the Company failed to satisfy a requirement of this Agreement, but the Company waives any right it may have to challenge, on legal grounds, the requirement that it pay a penalty pursuant to this paragraph III.B. (a), (b), or (c).

The MPCA does not waive any of its rights to enforce this Agreement or to seek redress for other violations of this Agreement or for any other violations of statutes, ordinances, or rules. However, upon tender by the Company of a required payment for a violation of this Agreement, and acceptance thereof by the MPCA, the Company shall not thereafter be subject to any additional civil penalty for that violation for which payment was made.

4. Access. The Company shall allow MPCA staff or any authorized representative, employee, or agent thereof, upon presentation of credentials, access at reasonable times to the Company's property and facilities to obtain such information and documentation as may be deemed by MPCA staff to be relevant to a determination that the Company is in compliance with this Agreement. This paragraph is not intended to limit any authority which MPCA staff may have under any existing law or rule.

5. Sampling and Data Availability. The Company shall make available to MPCA staff the results of sampling, tests, or other data generated by or for the Company, or on its behalf, in connection with the requirements of this Agreement.

6. Retention of Records. The Company shall retain in its possession all records, documents, reports and data related to this Agreement for at least three (3) years after the termination of this Agreement, despite any document retention policy to the contrary, and shall make all such documentation available to MPCA staff promptly upon request therefor.

### C. General Provisions

1. Review and Submittal of Submittals. MPCA staff shall review all submittals made by the Company as required by this Agreement and shall notify the Company in writing of the approval or disapproval of each submittal. MPCA staff and the Company shall at the request of either party consult with each other during the review of submittals or modifications. If a submittal is approved, it shall be considered a part of this Agreement and any requirement or term in such submittal shall be implemented by the Company. If any submittal is disapproved, in whole or in part, MPCA staff shall notify the Company of any inadequacies and shall indicate the necessary amendments or revisions. WITHIN THIRTY (30) CALENDAR DAYS after receipt of any notice of disapproval, the Company shall submit revisions to correct any such inadequacy. Upon approval by MPCA staff, the submittal shall be considered a part of this Agreement and any requirement or term in such submittal shall be implemented by the Company.

2. Covenants Not to Sue. In consideration of the Company's performance of the terms, covenants and agreements contained in this Agreement, the MPCA agrees that for such period of time that the Company is in compliance with this Agreement, it shall stand in lieu of any administrative, legal and equitable remedies available to the MPCA regarding the violations of Minnesota laws and rules described herein and occurring prior to the date hereof except that nothing in this Agreement shall preclude the MPCA from exercising any administrative, legal, or equitable remedies available to it to require additional efforts by the Company in the event that any further Company response beyond that contemplated by this Agreement is reasonably necessary to eliminate or abate any pollution of contamination or threat thereof or to remedy any violations occurring after the date hereof. The Company agrees not to challenge the violations alleged or settled herein, in this or any enforcement proceeding by the MPCA, which violations may also be relied upon by the MPCA as the basis for establishing in a future enforcement proceeding that such violations are repeated violations and for determining penalties in a future enforcement proceeding. The Company further agrees to waive all claims it may have, now and in the future, under Minn. Stat. § 3.763 for fees and expenses arising out of the matters addressed in this Agreement.

3. Remedies of the Parties. The terms of this Agreement shall be legally enforceable in a Court of appropriate jurisdiction and the MPCA retains the right to assert any legal, equitable or administrative right of action or defense that may be available by law or in equity in order to implement or enforce the terms of this Agreement.

4. Resolution of Disputes. Disputes regarding the meaning of any part of this Agreement, any obligation imposed by this Agreement or any obligation created by or imposed following any site investigation or corrective measures study or the inability of the parties to agree on the terms or requirements of a submittal required by this Agreement, shall be resolved as follows:

(a) If a dispute arises, the Company shall provide MPCA staff with a written statement supporting its position. MPCA staff shall issue an order resolving the matter(s) in dispute WITHIN TEN (10) WORKING days after

receipt of the Company's written statement. The order shall be considered a final administrative action of the MPCA regarding the issues in dispute, although it may be appealed to a court of appropriate jurisdiction. Unappealed orders shall govern the interpretation of the disputed portion(s) of this Agreement or the implementation of the terms and requirements of the disputed portion(s) of a submittal.

(b) During the resolution of any dispute under subpart III.C.4 (a) above, and during any subsequent judicial proceedings, the Company shall continue to implement those portions of the Agreement or those portions of a submittal which are not the subject of the dispute and can reasonably be implemented pending final resolution of the issues in dispute. In any case, upon receipt of the Commissioner's determination or, as the case may be, or a decision by a court to which the Commissioner's determination has been appealed, the Company shall promptly comply with all requirements of the MPCA.

5. Project Leaders. The MPCA and the Company shall each designate a Project Leader and an Alternate for the purposes of overseeing the implementation of this Agreement. WITHIN TEN (10) CALENDAR DAYS after the effective date of this Agreement, the Company shall notify MPCA staff of the name and address of its Project Leader and Alternate. The MPCA Project Leader will be an engineer. The MPCA Alternates shall be an inspector and a hydrologist. Either party may change its designated Project Leader or an Alternate by notifying the other party, in writing, of the change. To the maximum extent possible, communications between the Company and MPCA concerning the terms and conditions of this Agreement shall be directed through the Project Leaders. Each Project Leader shall be responsible for assuring that all communications from the other Project Leader are appropriately disseminated and processed. The Project Leaders and Alternates shall have the authority to:

- (1) Take samples or direct samples to be taken,
- (2) Observe, take photographs and make such other reports on the activities conducted at the site as the Project Leader or Alternate deems appropriate,
- (3) Review records, files and documents relative to this Agreement, and
- (4) Make or authorize minor field modifications or modification of techniques, procedures or design utilized in carrying out this Agreement which are necessary for the completion of the work identified in Exhibit A. Any field modification shall be approved orally by both Project Leaders, WITHIN THIRTY (30) CALENDAR DAYS following the modification. The Project Leader who requested the modification shall prepare a memorandum detailing the modification and the reasons therefore and shall provide or mail a copy of the memorandum to other the Project Leader.



6. Liability and Obligation. Except as specifically set forth in paragraph III.C.2 of this Agreement, this Agreement shall not release the Company from any liability or any obligation imposed by Minnesota statutes, rules, or ordinances now in effect or which may be adopted in the future.

7. Emergency Powers. Nothing in this Agreement shall prevent the MPCA from exercising its emergency power pursuant to Minn. Stat. § 116.11 (1990).

8. Amendments. This Agreement may be amended at any time by written agreement between the parties.

9. Hold Harmless Agreement. The Company agrees to indemnify, save and hold the MPCA, its agents and employees harmless from any and all claims or causes of action arising from or on account of acts or omissions of the Company, its officers, employees, agents or contractors in implementing the requirements of or activities conducted pursuant to this Agreement. The Company shall not indemnify the MPCA nor save nor hold its employees or agents harmless from any claims or causes of action to the extent arising out of the acts or omissions of the MPCA or its employees or agents.

10. Other Claims. Nothing herein is intended to or shall release any claims, causes of action or demands in law or equity against any individual, firm, partnership or corporation not a signatory to this Agreement for any liability it may have arising out of or relating to the release of any pollutant or contaminant at, to or from the facility. The MPCA shall not be held as a party to any contract entered into by the Company to implement the requirements of this Agreement.

11. Successors. This Agreement shall be binding upon the Company, its successors and assigns, and upon the MPCA, its successors and assigns. Should the Company sell or otherwise convey or assign any of its right, title or interest in the site, such conveyance shall not release the Company from any obligation imposed by this Agreement, unless the party to whom the right, title or interest has been transferred or assigned agrees in writing to fulfill the obligations of this Agreement and MPCA staff approve such transfer or assignment.

12. Extension of Time. MPCA staff may grant extensions of time schedules stated herein in the event that the Company demonstrates good cause for granting such extensions and provided that any such extension shall not have any adverse effect upon the environment. Any request for extension must be submitted in writing and received by MPCA staff at least three (3) working days prior to the applicable deadline.

13. Effective Date. The Agreement shall be effective upon the date it is signed by the MPCA Commissioner and the chairperson of the MPCA Board.

14. Company Information. The Company shall not knowingly make any false statement, representation or certification in any record, report, plan or other document filed or required to be submitted to MPCA staff under this Agreement. The Company shall immediately upon discovery report to MPCA staff any errors in such records, reports, plans or other documents.

15. Termination. This Agreement shall terminate upon notification to the Company by MPCA staff that the Company has satisfactorily completed the requirements of the Agreement.

BY THEIR SIGNATURES HEREON, THE UNDERSIGNED REPRESENT THAT  
THEY HAVE THE AUTHORITY TO BIND THE PARTIES THEY  
REPRESENT, THEIR AGENTS, CONTRACTORS, AND SUBSIDIARIES

PARAMAX SYSTEMS CORPORATION

By \_\_\_\_\_

Dated \_\_\_\_\_, 1992.

MINNESOTA POLLUTION CONTROL AGENCY

By \_\_\_\_\_  
Name  
Chairperson

Dated \_\_\_\_\_, 1992

By \_\_\_\_\_  
Name  
Commissioner

Dated \_\_\_\_\_, 1992

EXHIBIT A  
CORRECTIVE ACTION

for

PARAMAX SYSTEMS CORPORATION  
3333 PILOT KNOB ROAD  
EAGAN, MINNESOTA

Part III.B.1 of the Agreement, to which this Exhibit is attached, requires the Company to implement the requirements of Exhibit A, which establishes Corrective Action requirements for the site. All work conducted under this Agreement shall follow U.S. EPA RCRA Corrective Action Plan Guidance (November 14, 1986, OSWER Policy Directive #9902).

A. Consultant.

It is understood that the work to be performed in this Exhibit is to be conducted under the supervision of a qualified environmental consultant and the Company agrees to retain the services of such a consultant to complete the requirements of this Exhibit.

B. Area of Suspected Contamination.

Following is the area or location identified by MPCA staff and the Company that requires further investigation:

SOILS BENEATH THE BRICK AND MEMBRANE LINER SUMP (SUMP) LOCATED IN THE CURRENTLY NONOPERATIONAL WET CHEMICAL PROCESS ROOM.

C. Investigation.

1. Historical data.

WITHIN THIRTY (30) CALENDAR DAYS after the execution of this Agreement, the Company shall submit the following historical information to characterize the wet processing room sump (suspected source area):

a. Source Area Characteristics:

- 1) Location of source area
- 2) Type of source area
- 3) Additional design features not previously submitted
- 4) Operating practices (past and present)
- 5) Period of operation
- 6) Age of source area
- 7) General physical conditions

b. Waste Characteristics:

- 1) Type of waste (hazard classification, quantity, composition)
- 2) Physical and chemical characteristics
- 3) Duration of release
- 4) Migration and dispersal characteristics

2. Soil Investigation Work Plan.

WITHIN NINETY (90) CALENDAR DAYS after the effective date of this Agreement, the Company shall submit a Soil Investigation Work Plan to address the release described in Part II of this Agreement. The Soil Investigation Work Plan should describe the objectives of the investigation and the overall technical and analytical approach to completing all actions necessary to characterize the releases of hazardous wastes or hazardous constituents and their actual or potential receptors. The Soil Investigation Work Plan shall detail all proposed activities to be conducted at the site, the exact schedule for implementing and completing the investigation, the qualifications of personnel performing or directing the investigation, and the overall management of the investigation. The Soil Investigation Work Plan will be subject to review and approval by MPCA staff in accordance with Part III.C.1 of this Agreement. Specifically, the Soil Investigation Work Plan shall address:

- a. Contamination Characterization. The Company shall collect analytical data to define the horizontal and vertical extent, origin, direction, and rate of movement of contaminants. Data shall include time and location of sampling, media sampled, concentrations found, and conditions during sampling. The Company shall address all soil contamination at the site:
- b. Project Plans. The Soil Investigation Work Plan shall include the development of the following project plans which shall be prepared concurrently, including:
  - 1) Data Collection Quality Assurance Plan. The Company shall prepare a plan to conduct all monitoring procedures: sampling, field measurements and sample analysis performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid and properly documented.
  - 2) Health and Safety Plan. The Company shall prepare a facility Health and Safety Plan to specifically govern the soil investigation beneath the liner. The plan shall be consistent with NIOSH, OSHA and EPA requirements for hazardous waste site activities.

3. Investigation Implementation.

WITHIN THIRTY (30) CALENDAR DAYS after receiving written approval from MPCA staff of the Soil Investigation Work Plan, the Company shall begin implementation of the Soil Investigation.



#### 4. Final Report.

WITHIN SIXTY (60) CALENDAR DAYS after completion of the Soil Investigation, the Company shall submit a Final Report. The Final Report shall describe the procedures, methods, and results of the soil investigation, including without limitation, information on the type and extent of contamination at the site, sources and migration pathways, and actual or potential receptors.

The Final Report must contain adequate information to support further corrective action decisions at the site. The Final Report will be subject to review and approval by MPCA staff in accordance with Part III.C.1 of the Agreement.

#### D. Corrective Measures Study (CMS).

Based on the results of the Soil Investigation and the RFI, MPCA staff may require a Corrective Measures Study. If so, MPCA staff shall notify the Company in writing. This notice shall identify the hazardous constituent(s) which have exceeded action levels as well as those which have been determined to pose a threat to human health and the environment. The notification may also specify corrective measures considered to be evaluated by the Company during the CMS.

##### 1. Corrective Measures Study Work Plan.

WITHIN FORTY-FIVE (45) CALENDAR DAYS after notification from MPCA staff to conduct a CMS, the Company shall submit a CMS Work Plan. The CMS Work Plan shall include, but is not limited to the following:

- a. A list of alternative corrective measures to be evaluated;
- b. A definition of the objectives of the study;
- c. Schedules for conducting the study;
- d. A proposed format for presentation of information;
- e. Evaluation of performance, reliability, ease of implementation, and potential impacts of each corrective measure;
- f. Assessment of the effectiveness of each corrective measure in achieving adequate control of sources and cleanup of the contamination;
- g. Assessment of time required to begin and complete the corrective measure;
- h. Estimate of costs of corrective measures implementation; and
- i. Assessment of institutional requirements, such as state or local permit requirements, or other environmental or public health requirements which may affect implementation of the corrective measures.

##### 2. CMS Work Plan Approval.

The CMS Work Plan will be subject to review and approval by MPCA staff in accordance with Part III.C.1. of the Agreement.

3. CMS Implementation.

WITHIN FIFTEEN (15) CALENDAR DAYS after the Company has received written approval from MPCA staff of the CMS Work Plan, the Company shall begin to implement the CMS Work Plan. The CMS will be completed according to the schedules in the CMS Work Plan.

4. CMS Final Report and Corrective Measure Selection.

WITHIN SIXTY (60) CALENDAR DAYS after completing the CMS, the Company shall submit a CMS Final Report and proposed Corrective Measure Selection. The CMS Final Report shall summarize the evaluative results of each corrective measure studied and of any treatability and bench scale studies or pilot tests conducted. The CMS Final Report shall present all information gathered under the approved CMS Work Plan and shall recommend the most feasible corrective measure(s).

5. CMS Final Report and Corrective Measure Approval.

The CMS Report and Selection of corrective measures will be subject to review and approval by MPCA staff in accordance with Part III.C.1 of the Agreement. The four (4) general standards and five (5) decision factors by which MPCA staff will evaluate the recommended corrective measure(s) are:

STANDARDS

1. Protection of human health and the environment,
2. Achievement of media cleanup standards,
3. Control the sources of releases,
4. Compliance with standards for management of wastes,

FACTORS

1. Long-term reliability and effectiveness,
2. Reduction of toxicity, mobility, or volume of wastes,
3. Short-term effectiveness,
4. Implementability,
5. Cost

E. Corrective Measures Implementation (CMI).

1. Corrective Measures Design.

WITHIN SIXTY (60) CALENDAR DAYS after approval by MPCA staff of the corrective measure(s), the Company shall prepare and submit detailed construction plans and specifications (the "Corrective Measures Design") to implement the approved selected corrective measures. The Corrective Measures Design will be subject to review and approval by MPCA staff in accordance with Part III.C.1 of the Agreement. The Corrective Measures Design Work Plan must include, but is not limited to, the following:

1. Designs and specifications for equipment and processes;
2. Operation and long-term maintenance plans;
3. Project schedule;

4. Cost estimate;
5. Quality assurance measures;
6. Health and Safety Plan;
7. Method to evaluate effectiveness of corrective measures; and
8. Cleanup goals.

2. Corrective Measures Construction.

WITHIN THIRTY (30) CALENDAR DAYS after approval of the Corrective Measures Design, the Company shall begin construction of the corrective measures in accordance with the approved Corrective Measures Design schedule.

3. Corrective Measures Completion and Final Report.

WITHIN SIXTY (60) CALENDAR DAYS after completing corrective measures for the site, the Company shall submit a final report detailing all work performed during corrective measures implementation. The Final report shall include information such as field modifications to the approved CMI plans and specifications, field installation reports, daily inspections, as-built shop drawings, and total amounts of waste, soils, or water treated or removed from site.

F. Reporting Requirements.

The Company shall submit to MPCA staff signed quarterly progress reports on all activities (i.e., Soil Investigation, CMS and CMI) conducted pursuant to the provisions of this Exhibit. Report submittals shall begin NOT LATER THAN NINETY (90) CALENDAR DAYS after the effective date of the Agreement. The Progress Reports shall contain:

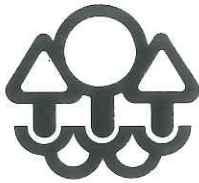
1. A description of work completed;
2. Summaries of all findings, including summaries of laboratory data;
3. Summaries of all problems or potential problems encountered during the reporting period and actions taken to rectify problems;
4. Projected work for the next reporting period; and
5. An explanation of any instance of noncompliance with the Agreement and a statement of actions taken to correct the noncompliance.

G. Continued Ground Water Monitoring.

The Company will continue to monitor the ground water at the site in accordance with the July 26, 1991, approved RFI Work Plan, and all MPCA approved modifications made to this Work Plan. Monitoring will continue for a period to be determined by MPCA staff based on the Company's ability to carry out the provisions of this Agreement.







# Minnesota Pollution Control Agency

520 Lafayette Road, Saint Paul, Minnesota 55155-3898

Telephone (612) 296-6300

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

May 28, 1992

RECEIVED  
JUN 1 1992  
OFFICE OF RCRA  
Waste Management Division  
U.S. EPA, REGION V

Mr. Dan MacDonald  
Principal Environmental Engineer  
Unisys Corporation  
3199 Pilot Knob Road  
MS F1B05  
Eagan, Minnesota 55121

Dear Mr. MacDonald:

RE: CORRECTIVE ACTION AGREEMENT - PRELIMINARY REVIEW  
PARAMAX CORPORATION - 3333 PILOT KNOB ROAD  
MNDO00823914

As indicated in our May 14, 1992, letter enclosed is the draft Corrective Action Agreement (CAA) for the above referenced site. Please review this document for historical accuracy.

We would like to meet with you and your staff to discuss the CAA approximately TWO (2) WEEKS FROM RECEIPT OF THIS LETTER. Dan Card of my staff will contact you to arrange the meeting.

If you have any questions during the interim, you may call Dan Card at 612/297-8379.

Sincerely,

Bruce W. Brott, P.E., Supervisor  
Permit and Review Unit  
Regulatory Compliance Section  
Hazardous Waste Division

BWB:rg

cc: Bob Egan, U.S. Environmental Protection Agency, Chicago  
Joel Morbito, U.S. Environmental Protection Agency, Chicago





# Minnesota Pollution Control Agency

520 Lafayette Road, Saint Paul, Minnesota 55155-3898

Telephone (612) 296-6300

P.T.B

March 17, 1992

RECEIVED

MAR 19 1992

OFFICE OF RCRA  
Waste Management Division  
U.S. EPA, REGION V

Mr. Dan MacDonald  
Principal Environmental Engineer  
Unisys Corporation  
3199 Pilot Knob Road  
MS F1B05  
Eagan, Minnesota 55121

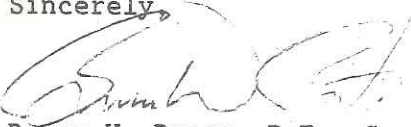
Dear Mr. MacDonald:

RE: RFI REPORT SUBMITTAL EXTENSION  
Paramax Corporation - 3333 Pilot Knob Road  
MND000823914

The Minnesota Pollution Control Agency (MPCA) staff received your February 19, 1992, request for an extension on submittal of Resource Conservation and Recovery Facility Investigation (RFI) report. Additional time was required to gather an additional round of ground water monitoring data in early February 1992. We concur that the additional round of ground water monitoring data will provide useful information. Further, based upon your telephone conversation with Dan Card of my staff on March 4, 1992, we understand that your consultant will require additional time to prepare the RFI report. For these reasons, your request for an extension on submittal of the RFI report is approved. The RFI report should be submitted BY APRIL 6, 1992.

You may contact Dan Card at 612/297-8379 if further discussion of this matter is required.

Sincerely,

  
Bruce W. Brott, P.E., Supervisor  
Permit and Review Unit  
Regulatory Compliance Section  
Hazardous Waste Division

BWB:rg

cc: Bob Egan, U.S. Environmental Protection Agency, Chicago  
Joel Morbito, U.S. Environmental Protection Agency, Chicago  
Mark Wilson, Paramax Corporation, St. Paul

198-34



**Minnesota Pollution Control Agency**

520 Lafayette Road North, St. Paul, Minnesota 55155-3898



Mr. Bob Egan  
U.S. EPA - Region V  
77 West Jackson Boulevard  
Chicago, IL 60604











# Minnesota Pollution Control Agency

---

May 19, 1994

Ms. Uylaine McMahan  
HRE-8J  
U.S. Environmental Protection Agency  
Region V  
Waste Management Division  
77 West Jackson Boulevard  
Chicago, Illinois 60604-3590

Dear Ms. McMahan:

Enclosed is a copy of the "Soil Investigation Final Report" for the Paramax Eagan (Unisys Park) site as you requested. This provided the basis for termination of the Corrective Action process at this site. If you have any questions on the report or on the termination action please contact Dan Card at 612/297-8379 or Byron Adams at 612/297-8373.

Sincerely,

Bruce W. Brott, P.E., Supervisor  
Permit and Review Unit  
Regulatory Compliance Section  
Hazardous Waste Division

BWB:ts

Enclosure



**UNISYS**

October 1, 1993

REC'D OCT 4, 1993  
HWS

Dan Card  
Minnesota Pollution Control Agency  
Ground Water and Solid Waste Division  
520 Lafayette Road  
St. Paul, MN 55155

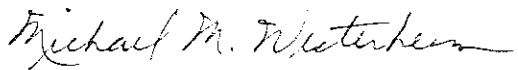
Re: **SOIL INVESTIGATION FINAL REPORT**  
**Corrective Action Agreement MND 000823914**  
**Unisys Park Facility**  
**3333 Pilot Knob Road**  
**Eagan, Minnesota**

Dear Mr. Card:

Enclosed are two copies of the Soil Investigation Final Report for the above referenced facility in accordance with the executed Corrective Action Agreement # MND 000823914 dated February 2, 1993.

Since chromium was not detected in the soil or groundwater at concentrations significantly above background levels, no further action is recommended at the site. If you have any questions please call me at (612) 687-2887.

Sincerely,



Michael M. Westerheim, P.E.  
Corporate Environmental Affairs

CC: K. Krueger, Unisys  
M. Wilson, Paramax  
A. Klein, Unisys



**SOIL INVESTIGATION FINAL REPORT**

**CORRECTIVE ACTION AGREEMENT**

**CAA #MND 000823914**

**PARAMAX SYSTEMS CORPORATION**

**3333 PILOT KNOB ROAD**

**EAGAN, MINNESOTA**

Prepared for the Minnesota Pollution Control Agency by:

Unisys Corporate Environmental Affairs

Mailstop F1B05

3199 Pilot Knob Road

Eagan, Minnesota 55121

(612) 687-3280

October, 1993





**SOIL INVESTIGATION FINAL REPORT  
PARAMAX SYSTEMS CORPORATION  
EAGAN, MINNESOTA**

**TABLE OF CONTENTS**

1. INTRODUCTION .....	1
2. SITE BACKGROUND AND SETTING .....	2
2.1. SITE HISTORY .....	2
2.2. GEOLOGIC SETTING .....	2
2.3. HYDROGEOLOGIC SETTING .....	3
2.3.1. BACKGROUND CHROMIUM CONCENTRATIONS IN GROUNDWATER .....	3
3. FIELD INVESTIGATION PROCEDURES .....	3
3.1. HEALTH & SAFETY PLAN .....	3
3.2. DATA COLLECTION .....	3
3.2.1. SOIL BORINGS .....	4
3.2.2. BACKGROUND SOIL SAMPLES .....	4
3.2.3. SOIL SAMPLING .....	4
3.2.4. SOIL SAMPLE ANALYTICAL PARAMETERS .....	5
3.3. GROUNDWATER SAMPLING .....	5
4. RESULTS OF FIELD INVESTIGATION .....	6
4.1. SOIL SAMPLING AND ANALYSIS .....	6
4.2. GROUNDWATER SAMPLING AND ANALYSIS .....	7
5. DISCUSSION OF RESULTS .....	7
5.1. SOILS .....	7
5.2. GROUNDWATER .....	8
6. SUMMARY AND CONCLUSIONS .....	8



**SOIL INVESTIGATION FINAL REPORT  
PARAMAX SYSTEMS CORPORATION  
EAGAN, MINNESOTA**

**FIGURES**

1. SITE MAP
2. SOIL BORING LOCATIONS - SUMP ROOM
3. SOIL BORING LOCATIONS - WASTEWATER TREATMENT ROOM
4. GEOLOGIC CROSS SECTION A-A'

**TABLES**

1. GROUNDWATER ELEVATION SUMMARY
2. SUMMARY OF WATER QUALITY
3. SUMMARY OF SOIL ANALYTICAL RESULTS
4. SUMMARY OF GEOTECHNICAL RESULTS
5. STATISTICAL ANALYSIS OF SOIL ANALYTICAL RESULTS
6. STATISTICAL ANALYSIS OF WATER QUALITY RESULTS

**REFERENCES**

**APPENDICES**

- A. BORING LOGS
- B. BERGERSON-CASWELL DRILLING REPORT
- C. QUALITY ASSURANCE/QUALITY CONTROL REPORT
  - Determination of Hexavalent Chromium in Soil by HPLC
  - Determination of Metals in Soil Using Microwave Digestion and ICP Spectroscopy
- D. SOIL ANALYTICAL RESULTS
- E. SOIL GEOTECHNICAL RESULTS
- F. GROUNDWATER MONITORING THIRD QUARTER, 1993 ANALYTICAL RESULTS



**SOIL INVESTIGATION FINAL REPORT**  
**PARAMAX SYSTEMS CORPORATION**  
**EAGAN, MINNESOTA**

**1. INTRODUCTION**

This report presents the procedures, methods and results of the Soil Investigation for the Paramax Site located at 3333 Pilot Knob Road in Eagan, Minnesota. This investigation proceeded in accordance with Exhibit A, Section C.3. and C.4. of the Corrective Action Agreement MND #00823914 dated February 2, 1993. Because chromium was observed in monitoring wells, and the possibility of a chromium release was undefined from the previous RFI work, the intent of this investigation was to determine if a release of metal bearing wastewater occurred and if the soils and groundwater underlying the sump room floor and the wastewater treatment room floor were impacted.

The Soil Investigation focused on two suspected source areas, the soils underlying the wet chemical process room (wet floor and sump) and the soils underlying the trench and underground storage tanks in the wastewater treatment room. In the sump room, metal bearing waste and rinse waters were suspected to have seeped through cracks in the floor and into the soils below; or wastewater may have seeped into the soils between the tank access sleeves and the trench in the wastewater treatment room.

The Soil Investigation for the Paramax Facility was completed in two phases. The first phase consisted of advancing three exploratory borings in the sump room. The results were analyzed and submitted to the MPCA on July 14, 1993 with the recommendation for no further action in the sump room. The recommendation was approved by the MPCA. The second phase of the Soil Investigation consisted of advancing three exploratory borings in the wastewater treatment room. Soil samples collected during the investigation were analyzed for total and hexavalent chromium, as well as other inorganic and geotechnical parameters to determine concentration of chromium in the subsurface and to evaluate the potential mobility of chromium in the soils at the site.

The Soil Investigation Final Report describes the overall technical and analytical approach used to characterize the suspected releases of hazardous wastes or toxic constituents. This Soil Investigation as well as the quarterly groundwater monitoring results indicate that there is little evidence of a past release of chromium bearing solutions from either the sump room or the wastewater treatment room to the underlying soils and groundwater. Based on the results of the Soil Investigation, it is recommended that no further action is necessary at the Paramax site.



## **2. SITE BACKGROUND AND SETTING**

### **2.1. SITE HISTORY**

The Paramax Facility, also known as Unisys Park, is currently used for office space and research and development. The facility is owned by Unisys Corporation and operated by Paramax, a wholly owned subsidiary of Unisys. The building is located at 3333 Pilot Knob Road near Yankee Doodle Road in Eagan, Minnesota (Figure 1). A detailed discussion of the site history is presented in the Historical Data Investigation Report, submitted to the MPCA in March, 1993 and approved April 5, 1993. The RFI Work Plan and RFI Final Report, submitted to the MPCA in January, 1991 and March, 1992, respectively, also present a detailed facility history.

Unisys entered into a Corrective Action Agreement with the MPCA in February, 1992 to investigate two suspected source areas for the chromium detected in the groundwater. This is the Final Report for the Soil Investigation portion of the Corrective Action Agreement.

### **2.2. GEOLOGIC SETTING**

The Unisys Park facility is located on gently rolling hills typical of glacial end moraine deposits. Surface elevation is approximately 900 above mean sea level (MSL). Surface drainage is mainly to the north of the facility, toward a small pond. Detailed descriptions of site topography, setting and drainage are presented in the RFI Work Plan (LBG, 1991) and RFI Final Report (LBG, 1992).

Based on boring log data from the test borings and monitoring wells installed at the site, and information from Minnesota Geological Survey, the surficial deposits consist of sand, gravel, silt and clay of the Superior Lobe deposited approximately 12,000 years ago. The Superior Lobe deposits originate in north eastern Minnesota and in the Superior Basin and contain a high percentage of iron-rich sediments with a characteristic red color. Bedrock beneath the site occurs at approximately 300 to 400 feet and consists of the Prairie du Chien Dolomite and Jordan Sandstone. These units form the Prairie du Chien-Jordan aquifer.

Based on soil survey information for Dakota County (Hudley, Steven J., 1983), the soils at the site are members of the Wadena-Hawick series and Kingsley-Mahtomedi series. The Wadena-Hawick series formed on outwash plains and terraces and the Kingsley-Mahtomedi series formed on loamy and sandy glacial till and outwash (that is, end moraines of the Superior Lobe). The soils at the site are representative of soils that formed on Superior Lobe outwash plains and end moraine.

Geochemical studies, which include analysis for chromium, have been completed by the MN-DNR on sediments sourced in the Superior Lobe (Martin, 1989; Nelson, 1992; and Buchheit, 1989). Results of these studies are summarized in the Soil Investigation





Work Plan. The MN-DNR data does indicate that chromium, as well as other metals, are naturally present in Superior Lobe sediments.

### **2.3. HYDROGEOLOGIC SETTING**

Localized groundwater flow direction is to the south and south east. Groundwater elevation data have been collected since the beginning of the monitoring program in 1988 and are shown in Table 1. Groundwater contours are depicted in Figure 1.

Based on boring log data from MW-4, MW-9 and MW-10, there is approximately 90 feet of unsaturated sediments underlying the building. Subsurface sediments consist of glacially derived sands and gravels with some silt and clay. The saturated hydraulic conductivity of the surficial aquifer at the site varies from 7.8 ft/day in MW-9 to 19 ft/day in MW-4. These results were taken from slug tests completed during the RFI in 1991. The saturated conductivity of these soils indicate adequate permeability for groundwater flow.

#### **2.3.1. BACKGROUND CHROMIUM CONCENTRATIONS IN GROUNDWATER**

In order to evaluate whether chromium detected in the groundwater was naturally occurring, information was sought from several sources. This information is presented in the Historical Data Investigation and the Soil Investigation Work Plan. Superior Lobe sourced aquifers contain total chromium concentrations ranging from 0.004 ppm to 0.12 ppm.

## **3. FIELD INVESTIGATION PROCEDURES**

### **3.1. HEALTH & SAFETY PLAN**

The Health and Safety Plan presented in the Soil Investigation Work Plan was utilized during the soil investigation. This plan was consistent with all pertinent regulations by the EPA, National Institute for Occupational Safety and Health, and the Occupational Health and Safety Administration. The Site Health and Safety Officer insured that all aspects of the Health and Safety Plan were followed during the field portion of the investigation.

### **3.2. DATA COLLECTION**

The data collected during the investigation was used to evaluate the extent of total chromium and hexavalent chromium in the soil below the floor of the wastewater treatment room and the sump room as well as to provide recommendations regarding future work at the site. Individual tasks were completed as outlined in the Soil



Investigation Work Plan and the Work Plan Addendum, which was submitted June 29, 1993. The following paragraphs describe the work completed in data collection.

### **3.2.1. SOIL BORINGS**

The soil boring program was completed as outlined in the Work Plan and Addendum. All boring locations are shown on Figure 1. Phase I consisted of completing 3 hand auger borings in the sump room to a maximum depth of 7 feet below the floor elevation and one background boring outside the facility near MW-3. Soil samples were taken approximately every 2 feet using a split spoon sample device. Boring locations in the sump room are shown in Figure 2.

Phase II consisted of advancing three hollow stem auger borings in the wastewater treatment room to a depth of 30 feet, or about 10 feet below the bottom of the tanks, and a background soil boring outside the facility near the location of the previous background soil boring. Boring locations in the wastewater treatment room are shown in Figure 3. Soil samples were taken approximately every 5 feet. A Unisys geologist was on site during drilling to log the geology and collect samples for analysis. Boring logs are included in Appendix A. The drilling report is included in Appendix B.

### **3.2.2. BACKGROUND SOIL SAMPLES**

A background soil boring was completed during each phase of the investigation. The background soil borings were completed on undisturbed soil at an elevation higher than the suspected source areas. The borings were advanced using the same equipment and methodologies used during the entire investigation. Sample equipment was decontaminated between samples.

Background samples were collected in approximately two foot intervals for Phase I and in approximately five foot intervals for Phase II of the investigation. The background soil samples were analyzed to determine naturally occurring concentrations of total and hexavalent chromium and as a control for comparison with the investigation final results.

### **3.2.3. SOIL SAMPLING**

At least 3 composite soil samples were collected from each boring and analyzed for total chromium and hexavalent chromium. One sample was collected from each boring and analyzed for total organic carbon (TOC), soil pH and grain size distribution. Soil samples were collected using 2-inch diameter split spoon sample devices. A soil pH measurement was completed in the field using color indicator pH paper on each sample.

Total and hexavalent chromium samples were collected by thoroughly mixing the contents of one 2 foot split spoon sampler on a clean sheet of plastic. The mixed sample was spread out evenly using a clean spatula. The soil was then divided into quarters until the appropriate volume was collected. The composite soil samples were



placed in clean, laboratory supplied glass jars with Teflon-lined lids using clean Nitrile gloves. Samples were then placed in a cool (4° C) container for shipment to the lab.

Clean plastic was used for each sample and sampling equipment (split spoon, spatula and miscellaneous tools) was decontaminated between each collection. When sampling was completed by a hand auger, the auger was washed with hot soap and water between bore holes. When drilling was completed by hollow stem auger, the auger flights were steam cleaned between borings.

Samples for TOC, soil pH and grain size were then collected from the remainder of the composite sample. If soil quantities were insufficient for the geotechnical parameters, these samples were collected from the next lower interval. A separate sample was collected from each boring for hydraulic conductivity analysis using brass Shelby tubes. Soil boring logs indicating sample intervals are included in Appendix A.

#### **3.2.4. SOIL SAMPLE ANALYTICAL PARAMETERS**

Interpoll Laboratory completed the analysis for total and hexavalent chromium. The laboratory quality assurance plan for Interpoll Lab is included in Appendix C. The geotechnical parameters were completed by Pace Laboratory and their quality assurance plan was submitted with the May, 1993 Soil Investigation Work Plan.

Hexavalent chromium analysis was conducted using High Performance Liquid Chromatography, EPA Method 218.6, Determination of Leachable Hexavalent Chromium in Soil Samples. Total chromium was determined by microwave digestion and Inductively Coupled Plasma Spectroscopy (EPA Method SW 846, 6010). Soil pH, total organic content, grain size distribution and hydraulic conductivity tests were performed by Pace Laboratory. Soil chromium analytical results are summarized in Table 3 and the soil physical properties are summarized in Table 4. The soil analytical lab reports for chromium are included in Appendix D and the geotechnical analysis results are in Appendix E.

#### **3.3. GROUNDWATER SAMPLING**

Quarterly groundwater monitoring and reporting has occurred since 1988 and during this investigation. Monitoring wells MW-1, MW-3, MW-5, MW-6, and MW-7 and MW-8, were sampled for two consecutive quarters to gather additional information on background chromium concentrations in the groundwater. The background chromium concentrations were used for comparison to monitoring wells MW-4, MW-9 and MW-10, which are located near the suspected chromium source and have been sampled routinely since their installation.

Monitoring wells were sampled for total and hexavalent chromium by personnel from Pace Laboratory. Prior to collection of the groundwater samples, a minimum of three well volumes were removed and the pH, temperature and specific conductance of each volume was recorded. The sample was collected after these parameters stabilized.



Pace sampling procedures are outlined in the 1991 RFI Work Plan submitted to the MPCA by LBG. Groundwater analytical results are summarized in Table 2. Third quarter, 1993 groundwater analytical reports are included in Appendix F.

Table 6 presents a statistical analysis of the groundwater quality data collected to date from the Unisys Park site. Concentrations in parts per million were entered into a spreadsheet and the mean, standard deviation and 95% confidence intervals of the results were calculated. A non-detectable concentration, for the purposes of the calculations, was entered as equal to one-half of the method detection limit.

## **4. RESULTS OF FIELD INVESTIGATION**

### **4.1. SOIL SAMPLING AND ANALYSIS**

The sediments below the facility consist mainly of glacially derived sands, gravels and clays of the Superior Lobe. Each split spoon sample was described using the Unified Soil Classification System. According to the laboratory grain size distribution tests for the samples collected (Appendix E), the sediments at the site range from silty sand to gravel. Particle size analysis was not completed on the finer grained sediments, although finer grained sediments such as silt and clay are present in borings SB-2, SB-3, SB-4, and SB-5. There was no visible evidence of discolored or etched sand grains or gravel in the samples described. Based on the boring logs from the soil investigation, a revised geologic cross section A-A' is shown in Figure 4. On the cross section, the soil boring locations are approximate locations within the building. Groundwater was not encountered in the borings.

A total of 36 soil samples were collected; 28 of the samples collected were analyzed for total and hexavalent chromium. The remainder of the samples were held for analysis pending the results of the investigation. Concentrations of total chromium were detected in all samples collected, whereas concentrations of hexavalent chromium were detected in only 9 of the 28 samples analyzed. The concentrations of total chromium ranged from 2 ppm in SB6-11'-15' to 14 ppm in SB1-0-2'. The concentration of hexavalent chromium ranged from below detection limits to 0.63 ppm in SB1-2'-4'.

The field pH measurements of 4 to 6 correspond with pH values found in the literature (Hundley, 1983). The laboratory derived soil pH values though, are 8 to 9. This is due to the different nature of the test. The field test was completed using color indicator pH paper on naturally moist soil and the laboratory test was completed by combining equal parts water and soil, mixing the solution and inserting a pH probe. A soil pH of 8.0 to 9.0 such as those observed at the site, is within the range of normal soil pH values and does not indicate the presence of acid solutions.

Total organic carbon content of soils at the site was between 0.1% to 1% (Table 4). Organic matter in a soil indicates the potential of the soil to render certain compounds,





such as metals or VOCs, immobile. Organic matter in the soils would contribute to the reduction of hexavalent chromium to trivalent chromium and further limit mobility of the metal.

Hydraulic conductivity was determined using a flexible wall constant head permeability test for a sample collected during the soil investigation. The hydraulic conductivity of the clay sample collected from SB2-6'-7' is  $4.6 \times 10^{-8}$  cm/sec ( $1.3 \times 10^{-4}$  ft/day). This value is typical conductivity value for glacial till (Freeze, 1979) and is also several orders of magnitude lower than the surrounding sandy soils. Because of the variability of the subsurface sediments, there is variability in the vertical and horizontal hydraulic conductivity.

#### **4.2. GROUNDWATER SAMPLING AND ANALYSIS**

The third quarter, 1993 total chromium results ranged from 0.013 ppm in MW-3 to 0.08 ppm in MW-8. MW-4 contained 0.04 ppm hexavalent chromium while all other wells sampled contained  $< 0.002$  ppm hexavalent chromium. These concentrations have not changed significantly since the beginning of the monitoring program in 1988. Groundwater concentrations are below the MDH-RAL for total and hexavalent chromium. A discussion of the results is in the following section. Analytical reports for the third quarter sampling event are included in Appendix F.

### **5. DISCUSSION OF RESULTS**

The plating solution containing dissolved metals and the process rinse solutions maintained low to moderate pH. If the chromium containing solutions entered the soils, a number of processes would govern their migration. Once released to the subsurface environment, with the clay-rich sediments of the Superior Lobe, the dissolved solutions would undergo a pH adjustment toward basic conditions. The buffering, dilution, and abundant substrate in the soils would encourage precipitation of the dissolved metals from solution. Based on the results of the soil investigation, the pH of the soils at the site are 9. If the soils were impacted by acid solutions, a lower pH value would be expected. The basic nature of the soils at the site, combined with the acid conditions of the plating wastes, may contribute to the immobilization of hexavalent chromium.

#### **5.1. SOILS**

The criteria established in the Work Plan to determine if soils were impacted by chromium was if the sample concentration was greater than 10 times the average background concentration. This criteria was established to screen out sampling and analytical bias and variance. The average background concentration of hexavalent chromium was 0.032 mg/Kg and the average total chromium background concentration



was 9.7 mg/Kg. Based on these average concentrations, the criteria to determine soil impact would be concentrations of 0.32 mg/Kg hexavalent chromium and 97 mg/Kg total chromium.

Chromium concentrations in the background borings SB-0 and SB-4 are in the same range as the chromium concentrations in soil borings SB-1 through SB-7, which indicates that the chromium detected is at naturally occurring concentrations.

As stated earlier, the Soil Investigation was completed in two phases. Phase I was completed in the sump room and Phase II was completed in the wastewater treatment room. No further action was completed in the sump room based on the fact that hexavalent chromium concentrations were below the detection limits in the deepest interval and total chromium concentrations were less than or equal to concentrations found in the background sample.

Phase II of the Soil Investigation consisted of drilling near the underground storage tanks and in the trench in the wastewater treatment room. Similar results were reached in Phase II as in Phase I. Hexavalent chromium concentrations in the deepest sample interval were non-detect or less than background concentrations. The results of Phase II of the Soil Investigation indicate that the chromium present in the soils at the site is a result of background conditions and no further action is necessary in the wastewater treatment room.

## **5.2. GROUNDWATER**

All monitoring wells at the site contain detectable concentrations of total chromium. There is no significant difference between the chromium concentrations detected in wells away from the suspected source area (MW-1, MW-3, MW-5, MW-6, MW-7, and MW-8) and the chromium concentrations detected in wells near the suspected source area (MW-4, MW-9, and MW-10). Average concentration of total chromium in wells near the suspected source area is 0.05 ppm and average concentration of total chromium in wells away from the suspected source area is 0.05 ppm. In addition, chromium concentrations detected in the groundwater are consistently below the Minnesota Department of Health Recommended Allowable Limit (RAL) (see Table 2).

Five years of groundwater monitoring conducted at the Unisys Park site reveal the chromium concentrations are naturally occurring. Concentrations of chromium in monitoring wells located near the suspected source area do not vary statistically from chromium concentrations in background monitoring wells.

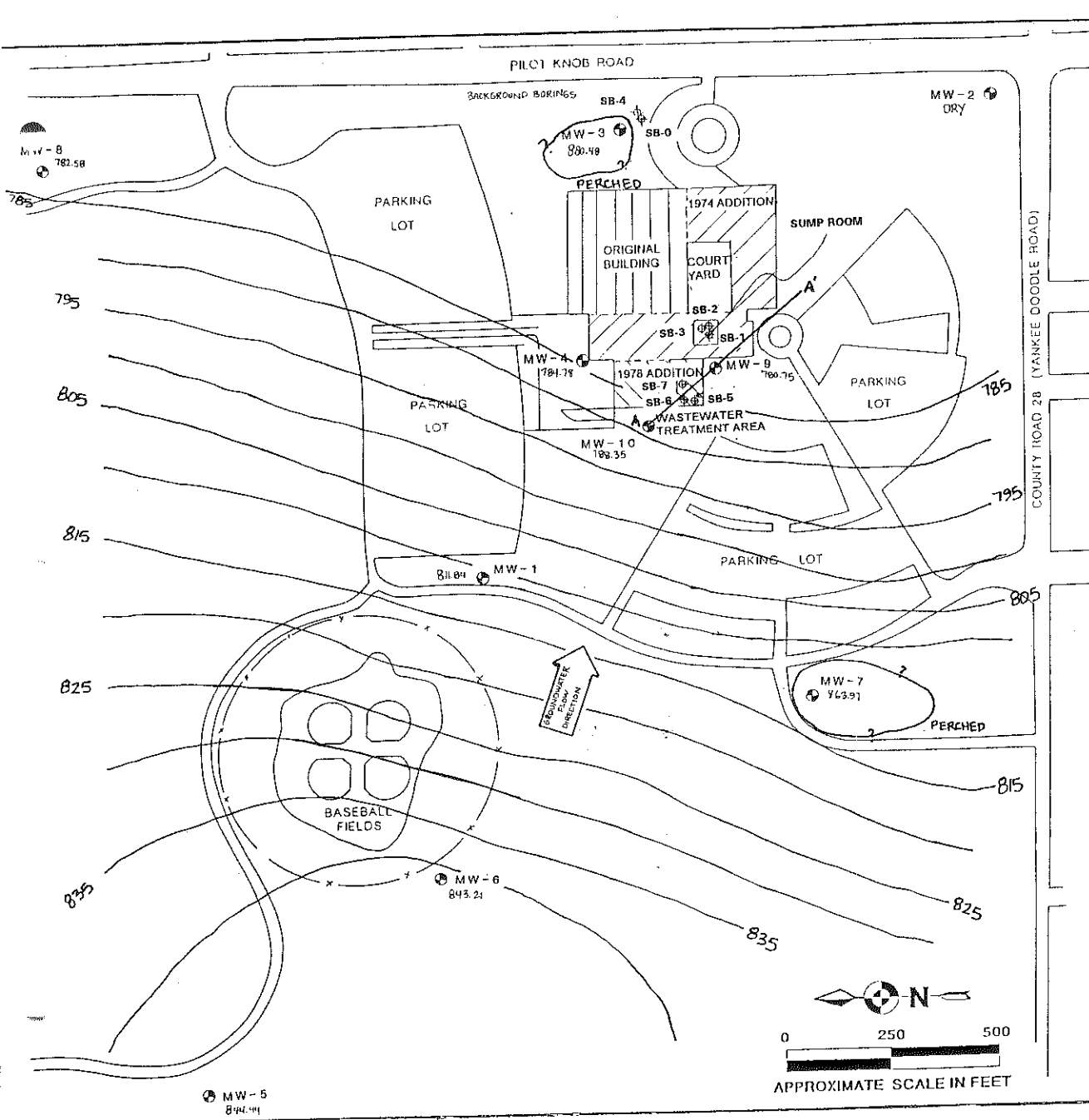




## 6. SUMMARY AND CONCLUSIONS

No significant release of plating or rinse water solution occurred through the concrete floor in either the sump room or through the tank access sleeves in the trench in the wastewater treatment room at Unisys Park. Soils underlying these areas have adequate retention, adsorption and immobility factors to mitigate a possible release. However, there was no evidence found during the investigation that a release occurred; soil chromium concentrations, soil pH values and physical observations indicate that there was not a detectable release of plating waste or rinse solutions to the subsurface. Since the plating and wastewater treatment operations have been decommissioned, the potential source areas have been removed.

The chromium concentrations observed in the monitoring wells are a matter of background concentrations due to the nature of the sediments in which the water occurs. The results of the Soil Investigation indicate the chromium detected in the soil and groundwater is a result of background conditions and no further action is required at the site.





 **SOIL BORING LOCATION**  
 **GROUNDWATER CONTOUR**  
**INTERVAL = 5 FEET**

# UNISYS CORPORATION UNISYS PARK

## SITE MAP

DATE	REVISED	PREPARED BY:	<p><b>LEGGETTE, BRASHEARS &amp; GRAHAM, INC.</b> Professional Ground-Water Consultants Northpark Corporate Center 1210 W. County Road E., Suite 700 St. Paul, MN 55112 (612) 490-1405</p>
DATE:			FIGURE 1





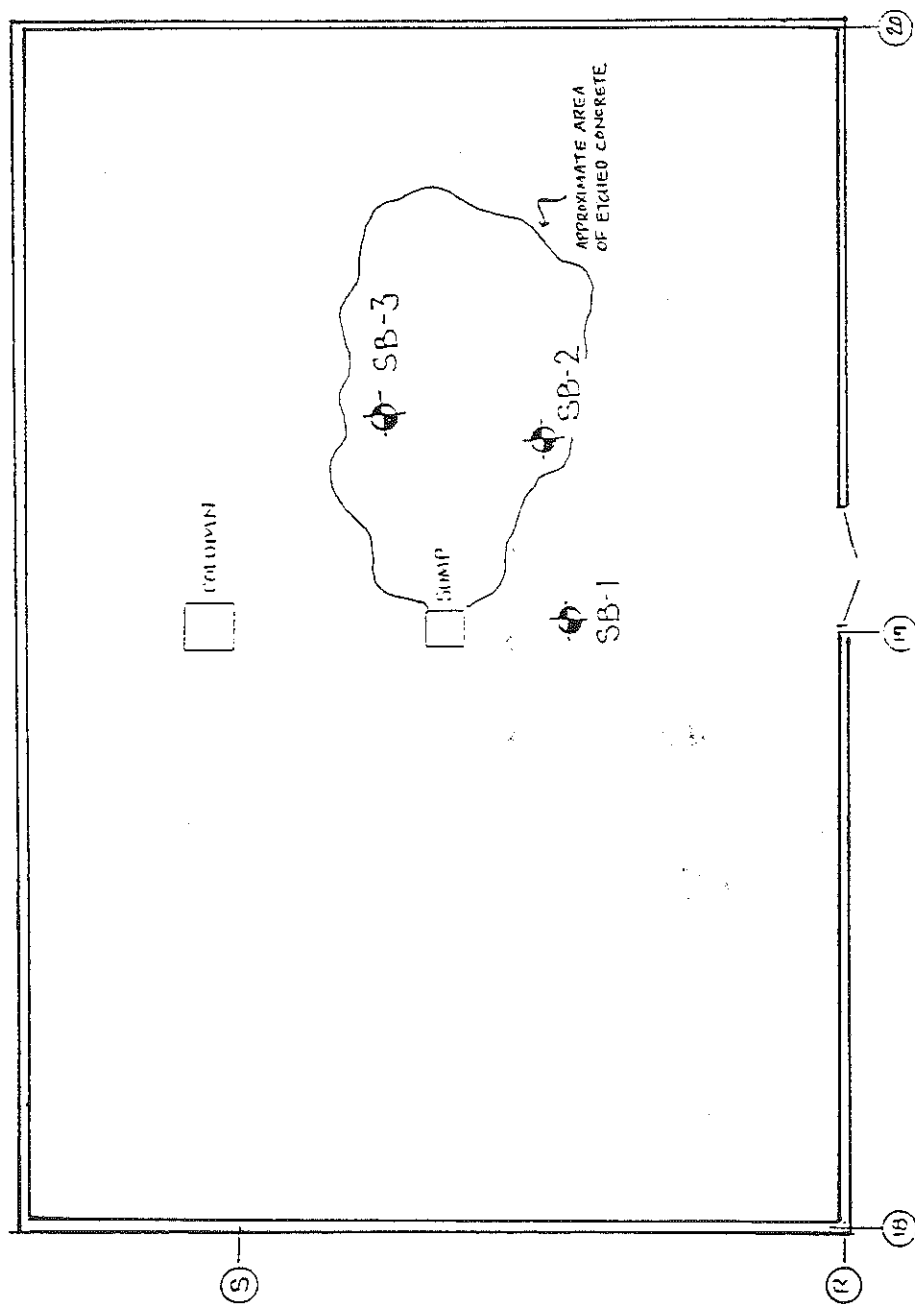
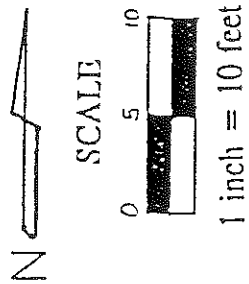


FIGURE 2

SOIL BORING LOCATIONS -  
SUMP ROOM

SOIL BORING LOCATION

SB-1



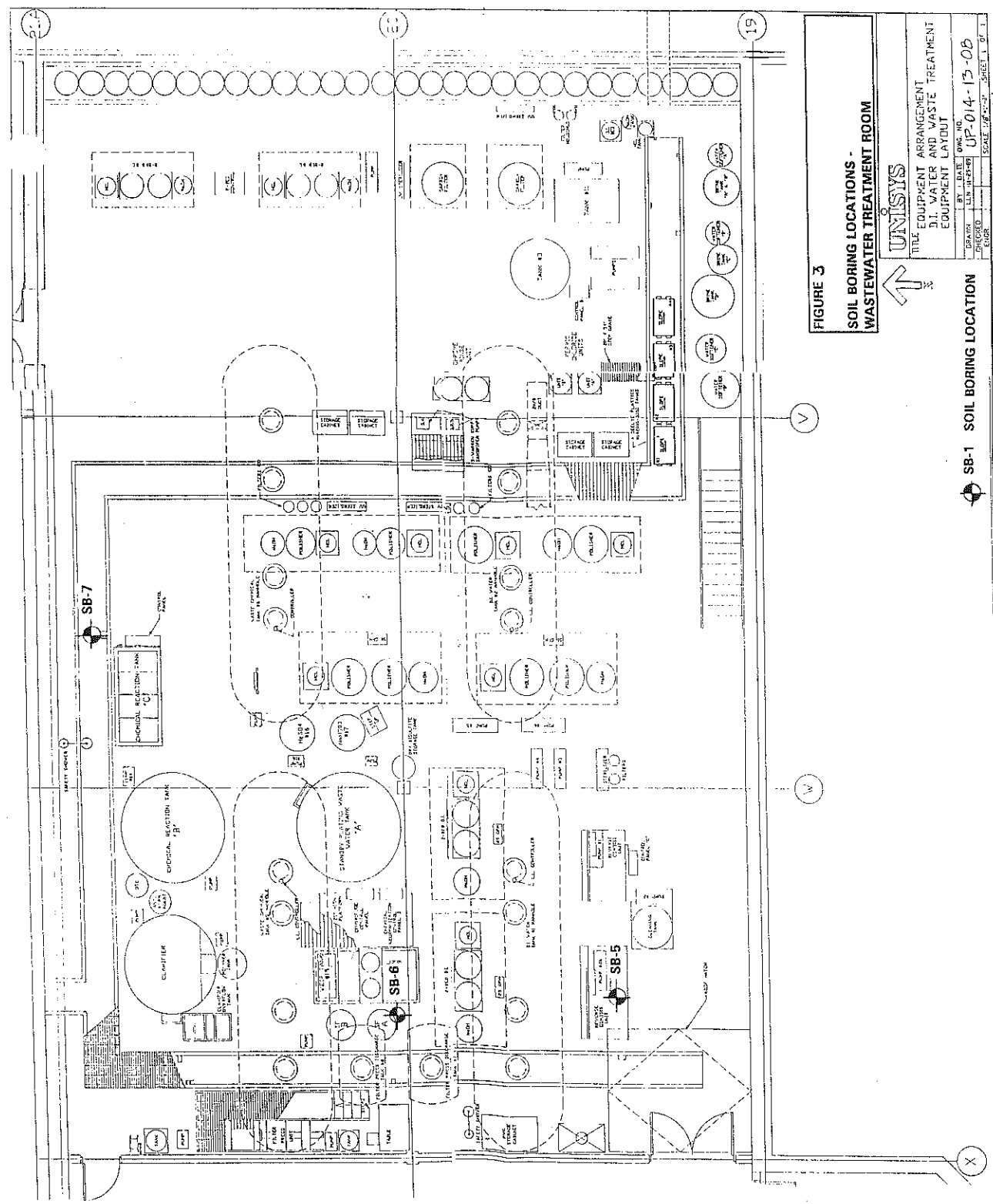


FIGURE 3

SOIL BORING LOCATIONS -  
WASTEWATER TREATMENT ROOM



TITLE  
EQUIPMENT ARRANGEMENT  
J.I. WATER AND WASTE TREATMENT  
EQUIPMENT LAYOUT

BY	DATE	OWN. NO.
UNISYS	UNISYS	UNISYS
UNISYS	UNISYS	UNISYS
UNISYS	UNISYS	UNISYS

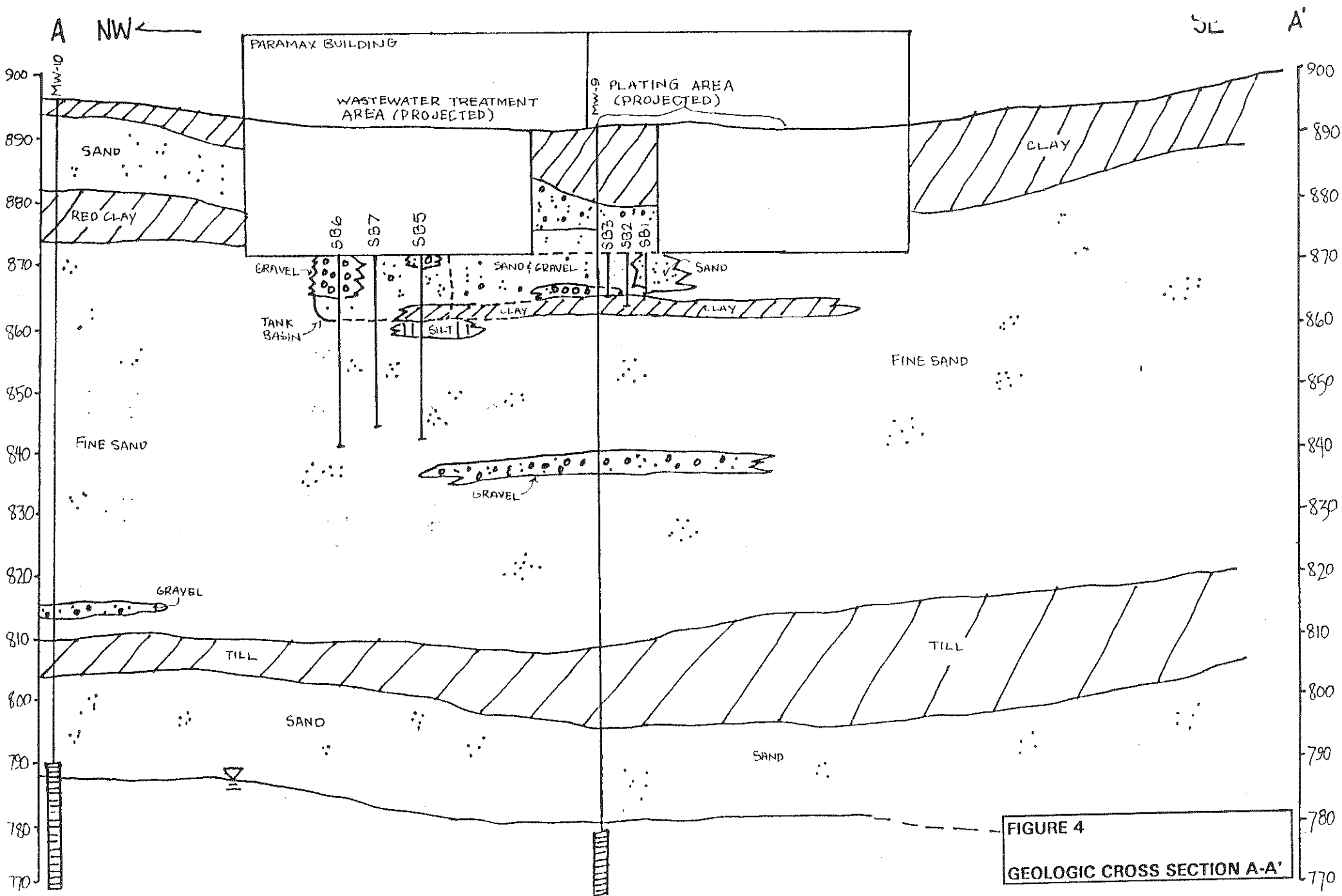
SB-1 SOIL BORING LOCATION



SCALE 1/8" = 1'-0"

SHEET 1 OF 1





**SCALE**  
1" = 50' horizontal  
1" = 20' vertical



TABLE 1  
WATER LEVEL SUMMARY  
and STABILIZATION DATA  
Unisys Park  
3333 Pilot Knob Road  
Eagan, Minnesota 55121

Well No.	Date	pH	Temperature (degrees C)	Conductance (umhos/cm)	TOC (feet)	DTW (feet)	Water Elevation (feet)
MW-1	13-May-93	8.3	11.50	580	869.93	58.12	811.81
MW-1	6-Aug-93	7.1	11.00	560	869.93	58.09	811.84
MW-3	23-Nov-92	7.10	7.50	550	891.89	12.06	879.83
MW-3	9-Feb-93	6.50	7.50	510	891.89	13.38	878.51
MW-3	13-May-93	7.80	8.00	520	891.89	12.56	879.33
MW-3	6-Aug-93	6.90	12.50	480	891.89	11.41	880.48
MW-4	24-Nov-92	7.80	7.00	1,100	882.10	98.48	783.62
MW-4	9-Feb-93	6.40	11.50	920	882.10	97.91	784.19
MW-4	13-May-93	7.80	13.50	920	882.10	97.65	784.45
MW-4	9-Aug-93	7.10	14.00	900	882.10	97.32	784.78
MW-5	13-May-93	7.10	10.00	1,230	851.43	9.45	841.98
MW-5	6-Aug-93	6.60	11.00	1,000	851.43	6.99	844.44
MW-6	13-May-93	7.70	10.50	640	859.87	20.27	839.60
MW-6	6-Aug-93	6.90	11.00	610	859.87	16.66	843.21
MW-7	13-May-93	7.80	8.50	460	870.99	7.90	863.09
MW-7	6-Aug-93	6.80	14.50	460	870.99	7.02	863.97
MW-8	23-Nov-92	8.00	6.80	480	890.95	109.10	781.85
MW-8	9-Feb-93	6.90	10.00	460	890.95	108.96	781.99
MW-8	13-May-93	7.90	12.00	590	890.95	108.60	782.35
MW-8	9-Aug-93	7.50	14.00	560	890.95	108.37	782.58
MW-9	23-Nov-92	8.10	6.80	810	892.17	112.67	779.50
MW-9	9-Feb-93	7.00	10.50	680	892.17	112.04	780.13
MW-9	14-May-93	8.00	13.00	690	892.17	111.72	780.45
MW-9	9-Aug-93	7.60	12.50	700	892.17	111.42	780.75
MW-10	23-Nov-92	8.20	5.80	680	896.03	108.84	787.19
MW-10	9-Feb-93	6.90	9.00	530	896.03	108.27	787.76
MW-10	14-May-93	8.10	12.00	560	896.03	108.01	788.02
MW-10	9-Aug-93	7.40	12.00	570	896.03	107.68	788.35

TOC = Top of Casing

DTW = Depth to Water below top of casing





## UNISYS PARK SITE, EAGAN, MN - SUMMARY OF WATER QUALITY

TABLE 2

WELL	DATE	CHROMIUM	DISSOLVED CHROMIUM	HEXAVALENT CHROMIUM	DISSOLVED HEXAVALENT CHROMIUM
MW-1	28-Jun-88	0.004 (2)	N/A	N/A	N/A
MW-1	25-Jul-88	0.003 (2)	N/A	N/A	N/A
MW-1	23-Jul-91	<0.1	<0.1	<0.2 (1)	N/A
MW-1	29-Jul-91	N/A	N/A	0.03	<0.02
MW-1	9-Oct-91	<0.1	<0.1	<0.02 (1)	N/A
MW-1	22-Jan-92	0.04	<0.005	<0.02	N/A
MW-1	28-Apr-92	0.014	<0.005	<0.02	N/A
MW-1	13-May-93	0.025	N/A	<0.02	N/A
MW-1	6-Aug-93	0.015	N/A	<0.02	N/A
MW-3	28-Jun-88	0.001 (2)	N/A	N/A	N/A
MW-3	25-Jul-88	0.003 (2)	N/A	N/A	N/A
MW-3	23-Jul-91	<0.1	<0.1	0.02 (1)	N/A
MW-3	29-Jul-91	N/A	N/A	0.04	0.02
MW-3	9-Oct-91	<0.1	<0.1	<0.02 (1)	N/A
MW-3	22-Jan-92	0.017	<0.005	<0.02	N/A
MW-3	28-Apr-92	<0.005	<0.005	<0.02	N/A
MW-3	11-Aug-92	0.015	N/A	<0.02	N/A
MW-3	23-Nov-92	0.014	N/A	<0.02	N/A
MW-3	9-Feb-93	0.01	N/A	<0.02	N/A
MW-3	13-May-93	0.009	N/A	<0.02	N/A
MW-3	9-Aug-93	0.013	N/A	<0.02	N/A
MW-4	28-Jun-88	0.059 (2)	N/A	N/A	N/A
MW-4	25-Jul-88	0.092 (2)	N/A	N/A	N/A
MW-4	24-Aug-88	0.064 (2)	N/A	0.06	N/A
MW-4	19-Feb-90	0.057	N/A	N/A	N/A
MW-4	23-Jul-91	<0.1	<0.1	0.06 (1)	N/A
MW-4	29-Jul-91	N/A	N/A	0.05	0.04
MW-4	9-Oct-91	<0.1	<0.1	0.04 (1)	N/A
MW-4	22-Jan-92	0.06	0.035	0.03	N/A
MW-4	29-Apr-92	0.033	0.029	0.03	N/A
MW-4	12-Aug-92	0.05	N/A	0.04 (3)	N/A
MW-4	24-Nov-92	0.054	N/A	0.06	N/A
MW-4	9-Feb-93	0.088	N/A	0.06	N/A
MW-4	14-May-93	0.092	N/A	0.03	N/A
MW-4	9-Aug-93	0.074	N/A	0.04	N/A
MW-5	22-Jul-91	0.02	<0.1	<0.01 (1)	N/A
MW-5	29-Jul-91	N/A	N/A	0.02	<0.02
MW-5	19-Feb-92	0.066	<0.005	<0.02	N/A
MW-5	28-Apr-92	0.02	<0.005	<0.02	N/A
MW-5	13-May-93	0.049	N/A	<0.02	N/A
MW-5	6-Aug-93	0.049	N/A	<0.02	N/A
MW-6	22-Jul-91	0.02	<0.1	<0.1 (1)	N/A
MW-6	29-Jul-91	N/A	N/A	0.02	<0.02
MW-6	9-Oct-91	<0.1	<0.1	<0.2	N/A
MW-6	22-Jan-92	0.042	<0.005	<0.005	N/A
MW-6	28-Apr-92	<0.005	<0.005	<0.02	N/A
MW-6	13-May-93	0.025	N/A	<0.02	N/A
MW-6	6-Aug-93	0.008	N/A	<0.02	N/A
MW-7	22-Jul-92	0.02	<0.1	<0.1 (1)	N/A



# UNISYS PARK SITE, EAGAN, MN - SUMMARY OF WATER QUALITY

## TABLE 2

WELL	DATE	CHROMIUM	DISSOLVED CHROMIUM	HEXAVALENT CHROMIUM	DISSOLVED HEXAVALENT CHROMIUM
MW-7	29-Jul-91	N/A	N/A	0.03	<0.02
MW-7	9-Oct-91	<0.1	<0.1	<0.02	N/A
MW-7	22-Jan-92	0.037	<0.005	<0.02	N/A
MW-7	28-Apr-92	<0.005	0.01	<0.02	N/A
MW-7	13-May-93	0.068	N/A	<0.02	N/A
MW-7	6-Aug-93	0.035	N/A	<0.02	N/A
MW-8	22-Jul-91	<0.1	<0.1	0.02 (1)	N/A
MW-8	29-Jul-91	N/A	N/A	0.02	<0.02
MW-8	9-Oct-91	<0.1	<0.1	<0.02	N/A
MW-8	22-Jan-92	0.26	<0.005	<0.005	N/A
MW-8	28-Apr-92	0.008	<0.005	<0.02	N/A
MW-8	12-Aug-92	0.038	N/A	<0.02	N/A
MW-8	23-Nov-92	0.13	N/A	<0.02	N/A
MW-8	9-Feb-93	0.034	N/A	<0.02	N/A
MW-8	13-May-93	0.62	N/A	<0.02	N/A
MW-8	9-Aug-93	0.084	N/A	<0.02	N/A
MW-9	23-Jul-91	<0.1	<0.1	<0.02 (1)	N/A
MW-9	29-Jul-91	N/A	N/A	0.04	0.02
MW-9	9-Oct-91	<0.1	<0.1	<0.02	N/A
MW-9	22-Jan-92	<0.005	<0.005	<0.02	N/A
MW-9	29-Apr-92	0.009	<0.005	<0.02	N/A
MW-9	11-Aug-92	0.021	N/A	<0.02	N/A
MW-9	23-Nov-92	0.032	N/A	<0.02	N/A
MW-9	9-Feb-93	0.021	N/A	<0.02	N/A
MW-9	14-May-93	0.14	N/A	<0.02	N/A
MW-9	9-Aug-93	0.065	N/A	<0.02	N/A
MW-10	23-Jul-91	<0.1	<0.1	0.02 (1)	N/A
MW-10	29-Jul-91	N/A	N/A	0.03	0.02
MW-10	9-Oct-91	<0.1	<0.1	<0.02	N/A
MW-10	22-Jan-92	0.11	<0.005	<0.02	N/A
MW-10	29-Apr-92	0.014	<0.005	<0.02	N/A
MW-10	12-Aug-92	0.016	N/A	<0.02	N/A
MW-10	23-Nov-92	0.046	N/A	<0.02	N/A
MW-10	9-Feb-93	0.001	N/A	<0.02	N/A
MW-10	14-May-93	0.14	N/A	<0.02	N/A
MW-10	9-Aug-93	0.026	N/A	<0.02	N/A
RAL		0.1	0.1	0.1	0.1

ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (MG/L)

N/A = NOT ANALYZED

(1) ANALYSIS CONDUCTED IN EXCESS OF EPA RECOMMENDED HOLDING TIME

(2) REPRESENTS TOTAL CHROMIUM

(3) RESULT IS CORRECTED FOR SAMPLE COLOR AND/OR TURBIDITY



**TABLE 3**  
**UNISYS PARK**  
**CORRECTIVE ACTION AGREEMENT**  
**SUMMARY OF SOIL ANALYTICAL RESULTS**

	BACKGROUND		WET CHEMICAL PROCESSING ROOM						BACKGROUND		WASTEWATER TREATMENT ROOM						
DEPTH (feet)	SB0		SB1		SB2		SB3		SB4		SB5		SB6		SB7		DEPTH (feet)
	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	
0 - 2'	< 0.024	12	0.096	14	0.37	13	< 0.021	7					< 0.021*	7	0.034	4	0 - 2'
2' - 4'	0.032	11	0.63	7	< 0.022	10	< 0.021	4			< 0.021	12	< 0.021	8	0.17	4	2' - 4'
4' - 6'	< 0.022	10	< 0.022*	9	< 0.022	10	< 0.020	3							0.033	3	4' - 6'
9' - 11'											< 0.022	9	0.026	2			9' - 11'
10' - 12'									< 0.022	11							10' - 12'
11' - 13'											< 0.021	4	0.023	2			11' - 13'
13' - 15'											< 0.020	3	< 0.020	2			13' - 15'
15' - 17'															N/A	N/A	15' - 17'
17' - 19'									< 0.022	10							17' - 19'
20' - 22'									< 0.022	10	N/A	N/A			N/A	N/A	20' - 22'
25' - 27'									< 0.021	4	N/A	N/A	N/A	N/A	N/A	N/A	25' - 27'
28' - 30'											N/A	N/A	N/A	N/A			28' - 30'

**CALCULATED ACTION LEVEL BASED ON BACKGROUND CONCENTRATIONS:**

**HEXAVALENTCHROMIUM = 0.3 MG/KG**

**TOTAL CHROMIUM = 110 MG/KG**

**NOTES**

All results in mg/Kg.

Samples analyzed by Interpoll Laboratories using EPA Method 218.6 for hexavalent chromium and EPA Method SW-846, 6010 for total chromium.

SB0 and SB4 are background borings, taken on the northeastern side of the building near MW-3.

\*SB1 bottom sample depth is 4.5' - 6.5'.

\*SB6 surface sample interval is 0 to 4'.

N/A = no analysis requested at time of sample check-in.



**TABLE 4  
UNISYS PARK  
CORRECTIVE ACTION AGREEMENT**

**SUMMARY OF SOIL PHYSICAL PROPERTIES**

	BACKGROUND		WET CHEMICAL PROCESSING ROOM								BACKGROUND		WASTEWATER TREATMENT ROOM								
DEPTH (feet)	SB0		SB1		SB2		SB3		SB4		SB5		SB6		SB7		DEPTH (feet)				
	TOC %	pH	TOC %	pH	TOC %	pH	TOC %	pH	TOC %	pH	TOC %	pH	TOC %	pH	TOC %	pH					
2' - 4'	0.50	8.6														8.7	2' - 4'				
4' - 6'			0.16	9.1	0.41	8.9	0.12	9.2					0.19	9.0	0.16		4' - 6'				
11' - 13'												8.7					11' - 13'				
13' - 15'												0.17					13' - 15'				
20' - 22'									0.96	8.7							20' - 22'				

**SB2-6'-7' HYDRAULIC CONDUCTIVITY =  $4.6 \times 10^{-8}$  cm/sec**

Samples collected by Unisys and analyzed by Pace Laboratories.  
TOC = total organic carbon, in %.





TAP 5  
UNISY ARK  
CORRECTIVE ACTION AGREEMENT  
STATISTICS ANALYSIS OF SOIL ANALYTICAL RESULTS  
ALL RESULTS IN MG/KG

ALL RESULTS IN MG/KG																	
BACKGROUND		WET CHEMICAL PROCESSING ROOM							BACKGROUND		WASTEWATER TREATMENT ROOM						
DEPTH (feet)	SB0		SB1		SB2		SB3		SB4		SB5		SB6		SB7		DEPTH (feet)
	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	Cr VI	Cr	
0 - 2'	0.012	12.00	0.096	14.00	0.37	13.00	0.0105	7.00					0.0105	7.00	0.034	4.00	0 - 2'
2' - 4'	0.032	11.00	0.63	7.00	0.011	10.00	0.0105	4.00			0.0105	12.00	0.0105	8.00	0.17	4.00	2' - 4'
4' - 6'	0.011	10.00	0.011	9.00	0.011	10.00	0.01	3.00							0.033	3.00	4' - 6'
9' - 11'											0.011	9.00	0.026	2.00			9' - 11'
10' - 12'									0.011	11.00							10' - 12'
11' - 13'											0.0105	4.00	0.023	2.00			11' - 13'
13' - 15'											0.01	3.00	0.01	2.00			13' - 15'
15' - 17'																	15' - 17'
17' - 19'									0.011	10.00							17' - 19'
20' - 22'									0.011	10.00							20' - 22'
25' - 27'									0.0105	4.00							25' - 27'
28' - 30'																	28' - 30'
MEAN	0.02	11.00	0.25	10.00	0.13	11.00	0.01	4.67	0.01	8.75	0.01	7.00	0.02	4.20	0.08	3.67	MEAN
STD DEV	0.01	1.00	0.34	3.61	0.21	1.73	0.00	2.08	0.00	3.20	0.00	4.24	0.01	3.03	0.08	0.58	STD DEV
SIZE	3	3	3	3	3	3	3	3	4	4	4	4	5	5	3	3	SIZE
95% CONF.	0.01	1.13	0.38	4.08	0.23	1.96	0.00	2.36	0.00	3.14	0.00	4.16	0.01	2.66	0.09	0.65	95% CONF.
HI VALUE	0.03	12.13	0.63	14.08	0.37	12.96	0.01	7.02	0.01	11.89	0.01	11.16	0.02	6.86	0.17	4.32	HI VALUE
LO VALUE	0.00	9.87	-0.13	5.92	-0.10	9.04	0.01	2.31	0.01	5.61	0.01	2.84	0.01	1.54	-0.01	3.01	LO VALUE

CALCULATED ACTION LEVEL BASED ON BACKGROUND CONCENTRATIONS:

HEXAVALENT CHROMIUM = 0.3 MG/KG

TOTAL CHROMIUM = 110 MG/KG

NOTES

Hexavalent chromium concentrations of 0.010, 0.011, 0.012 and 0.0105 are equal to one-half the detection limit.

Samples analyzed by Interpoll Laboratories using EPA Method 218.6 for hexavalent chromium and EPA method SW-846, 6010 for total chromium.

SB0 and SB4 are background borings, taken on the northeastern side of the building near MW-3.

\*SB1 bottom sample depth is 4.5' - 6.5'.

SB6 surface sample interval is 0 to 4'.



TABLE 6

## UNISYS PARK - STATISTICAL ANALYSIS OF WATER QUALITY RESULTS

WELL	DATE	CHROMIUM	HEXAVALENT CHROMIUM
MW-1	6/28/88	0.004	
MW-1	7/25/88	0.003	
MW-1	7/23/91(1)	0.05	0.1
MW-1	7/29/91		0.03
MW-1	10/9/91(1)	0.05	0.01
MW-1	1/22/92	0.04	0.01
MW-1	4/28/92	0.014	0.01
MW-1	5/13/93	0.014	0.01
MW-1	8/6/93	0.015	0.01
	MEAN	0.024	0.026
	STD DEV	0.020	0.034
	SIZE	8	7
	95 % CONF	0.014	0.025
	HIGH VALUE	0.037	0.051
	LOW VALUE	0.010	0.001
MW-3	6/28/88(2)	0.001	
MW-3	7/25/88(2)	0.003	
MW-3	7/23/91(1)	0.05	0.02
MW-3	7/29/91		0.04
MW-3	10/9/91(1)	0.05	0.01
MW-3	1/22/92	0.017	0.01
MW-3	4/28/92	0.0025	0.01
MW-3	8/11/92	0.015	0.01
MW-3	11/23/92	0.014	0.01
MW-3	2/9/93	0.01	0.01
MW-3	5/13/93	0.01	0.01
MW-3	8/6/93	0.013	0.01
	MEAN	0.017	0.014
	STD DEV	0.017	0.010
	SIZE	11	10
	95 % CONF	0.010	0.006
	HIGH VALUE	0.027	0.020
	LOW VALUE	0.007	0.008
MW-4	6/28/1988(2)	0.059	
MW-4	7/25/1988(2)	0.092	
MW-4	8/24/1988(2)	0.064	0.06
MW-4	2/19/90	0.057	
MW-4	7/23/1991(1)	0.05	0.06
MW-4	7/29/91		0.05
MW-4	10/9/1991(1)	0.05	0.04
MW-4	1/22/92	0.060	0.03
MW-4	4/29/92	0.033	0.03



TABLE 6

## UNISYS PARK - STATISTICAL ANALYSIS OF WATER QUALITY RESULTS

WELL	DATE	CHROMIUM	HEXAVALENT CHROMIUM
MW-4	8/12/1992(3)	0.050	0.04
MW-4	11/24/92	0.054	0.06
MW-4	2/9/93	0.088	0.06
MW-4	5/14/93	0.092	0.03
MW-4	8/9/93	0.074	0.04
	MEAN	0.063	0.045
	STD DEV	0.018	0.013
	SIZE	13	11
	95 % CONF	0.010	0.008
	HIGH VALUE	0.073	0.053
	LOW VALUE	0.053	0.038
MW-5	7/22/1991(1)	0.020	0.005
MW-5	7/29/91		0.02
MW-5	2/19/92	0.066	0.01
MW-5	4/28/92	0.02	0.01
MW-5	5/13/93	0.049	0.01
MW-5	8/6/93	0.049	0.01
	MEAN	0.041	0.011
	STD DEV	0.020	0.005
	SIZE	5	6
	95 % CONF	0.018	0.004
	HIGH VALUE	0.059	0.015
	LOW VALUE	0.023	0.007
MW-6	7/22/1991(1)	0.02	0.05
MW-6	7/29/91		0.02
MW-6	10/9/91	0.05	0.01
MW-6	1/22/92	0.042	0.01
MW-6	4/28/92	0.0025	0.01
MW-6	5/13/93	0.025	0.01
MW-6	8/6/93	0.008	0.01
	MEAN	0.025	0.017
	STD DEV	0.019	0.015
	SIZE	6	7
	95 % CONF	0.015	0.011
	HIGH VALUE	0.039	0.028
	LOW VALUE	0.010	0.006
MW-7	7/22/92(1)	0.020	0.05
MW-7	7/29/91		0.03
MW-7	10/9/91	0.05	0.01
MW-7	1/22/92	0.037	0.01



TABLE 6

## UNISYS PARK - STATISTICAL ANALYSIS OF WATER QUALITY RESULTS

WELL	DATE	CHROMIUM	HEXAVALENT CHROMIUM
MW-7	4/28/92	0.0025	0.01
MW-7	5/13/93	0.068	0.01
MW-7	8/6/93	0.035	0.01
	MEAN	0.035	0.019
	STD DEV	0.023	0.016
	SIZE	6	7
	95 % CONF	0.018	0.012
	HIGH VALUE	0.054	0.030
	LOW VALUE	0.017	0.007
MW-8	7/22/91(1)	0.05	0.02
MW-8	7/29/91		0.02
MW-8	10/9/91	0.05	0.01
MW-8	1/22/92	0.26	0.0025
MW-8	4/28/92	0.008	0.01
MW-8	8/12/92	0.038	0.01
MW-8	11/23/92	0.13	0.01
MW-8	2/9/93	0.034	0.01
MW-8	5/14/93	0.62	0.01
MW-8	8/9/93	0.084	0.01
	MEAN	0.142	0.011
	STD DEV	0.195	0.005
	SIZE	9	10
	95 % CONF	0.127	0.003
	HIGH VALUE	0.269	0.014
	LOW VALUE	0.014	0.008
MW-9	7/23/91(1)	0.05	0.01
MW-9	7/29/91		0.04
MW-9	10/9/91	0.05	0.01
MW-9	1/22/92	0.0025	0.01
MW-9	4/29/92	0.009	0.01
MW-9	8/11/92	0.021	0.01
MW-9	11/23/92	0.032	0.01
MW-9	2/9/93	0.021	0.01
MW-9	5/14/93	0.14	0.01
MW-9	8/9/93	0.065	0.01
	MEAN	0.043	0.013
	STD DEV	0.042	0.009
	SIZE	9	10
	95 % CONF	0.027	0.006
	HIGH VALUE	0.071	0.019
	LOW VALUE	0.016	0.007





TABLE 6

## UNISYS PARK - STATISTICAL ANALYSIS OF WATER QUALITY RESULTS

WELL	DATE	CHROMIUM	HEXAVALENT CHROMIUM
MW-10	7/23/91(1)	0.05	0.02
MW-10	7/29/91		0.03
MW-10	10/9/91	0.05	0.01
MW-10	1/22/92	0.110	0.01
MW-10	4/29/92	0.014	0.01
MW-10	8/12/92	0.016	0.01
MW-10	11/23/92	0.046	0.01
MW-10	2/9/93	0.001	0.01
MW-10	5/14/93	0.14	0.01
MW-10	8/9/93	0.026	0.01
	MEAN	0.050	0.013
	STD DEV	0.046	0.007
	SIZE	9	10
	95 % CONF	0.030	0.004
	HIGH VALUE	0.081	0.017
	LOW VALUE	0.020	0.009

ALL CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (MG/L)  
 0.01 or 0.0025 = ONE HALF DETECTION LIMITS.



## REFERENCES

- Buchheit, R.L., et. al., 1989. *Glacial Drift Geochemistry for Strategic Minerals; Duluth Complex, Lake County, Minnesota*. Report 262, Minnesota Department of Natural Resources - Division of Minerals.
- Chrostowski, Paul C., Durda, Judi L. and Edelmann, Kristen G., 1991. The Use of Natural Processes For the Control of Chromium Migration: *Remediation*, Summer, 1991. pp.341-351.
- Freeze, R.A. and Cherry, J.A. 1979. *Groundwater*. Prentice-Hall, New Jersey.
- Hundley, Steven J. 1983. *Soil Survey of Dakota County, Minnesota*. U.S. Department of Agriculture - Soil Conservation Service.
- Leggette, Brashears & Graham. March, 1992. RCRA Facility Investigation Unisys Park Facility.
- Leggette, Brashears & Graham. January, 1991. RCRA Facility Investigation Work Plan Unisys Park Facility.
- Martin, D.P., et. al., 1989. *Regional Geochemical Survey of Glacial Drift Drill Samples Over Archean Granite-Greenstone Terrane in the Effie Area, Northern Minnesota*. Report 263, Minnesota Department of Natural Resources - Division of Minerals.
- Minnesota Pollution Control Agency. RCRA Facility Assessment - Unisys Park Facility. October 1990. Prepared for the U.S. EPA Region IV.
- Morey, G.B. and Lively R.S. May 16, 1980. Detailed Geochemical Survey for East Central Minnesota, Geology and Geochemistry of Selected Uranium Targets. U.S. Department of Energy Report Number K/UR-32.
- Nelson, S.L., et. al., 1992. *Chemical and Mineralogical Analysis and Geological Characteristics of Heavy Minerals from Graciofluvial Sediments in Minnesota*. Open File Report 284, Minnesota Department of Natural Resources - Division of Minerals.
- Unisys Corporate Environmental Affairs, March, 1993. Historical Data Investigation - Unisys Park Facility Corrective Action Agreement #MND 000823914.
- Unisys Corporate Environmental Affairs, May, 1993. Soil Investigation Work Plan - Unisys Park Facility Corrective Action Agreement #MND 000823914.
- United States Environmental Protection Agency, November 1991. *Description and Sampling of Contaminated Soils: A Field Pocket Guide*.

